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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/387,164	08/31/1999	YONGJUN HU	303.607US1	2253
21186	7590	06/27/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402-0938			ROY, SIKHA	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/387,164

Applicant(s)

HU, YONGJUN

Examiner

Sikha Roy

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

The Amendment, filed on April 13, 2005 has been entered and is acknowledged by the Examiner.

Claim Objections

Claim 12 is objected to because of the following informalities:

Claim 12 being in independent form, ' The device of claim 11' in lines 4,5 should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,534,743 to Jones et al., and further in view of U.S. Patent 5,372,973 to Doan et al.

Regarding claim 1 Jones discloses (Figs. 24, 25 column 17 lines 31-57) a field emitter display device comprising emitter 402 comprising a cylindrical body portion 404 and tip portion 406 having a layer 409 conforming to the entire surface of the emitter (formed on the tip and on the side walls of the emitter column) by ion beam deposition.

Jones further discloses the ion beam deposited layer or ion implanted layer (408 in Fig. 24, 409 in Fig. 25) is formed of silicon monoxide layer providing tunneling layer for emission of electrons.

The Examiner notes that the claim limitation "implanted oxide layer" is drawn to a process of manufacturing (formed by implantation) which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113). Therefore, it is the position of the examiner that it would have been obvious to one of ordinary skill in the art that the emitter with ion beam deposited silicon monoxide layer disclosed by Jones is at least a fully functional equivalent to the Applicant's claimed emitter with implanted oxide layer as evidenced by Jones suggestion of all of the Applicant's claimed structural limitations.

Claim 1 differs from Jones in that Jones does not disclose an external coating.

Doan et al. in analogous art of cold cathode emitter tips disclose (column 6 lines 34-56) the cathode tips coated with a low work function material. It is further noted that this external coating results in a sharper emitter tip with a lower work function and greater resistance to erosion.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the external coating of Doan et al. on the ion beam deposited oxide layer of the emitter of Jones for a sharper emitter tip with a lower work

function and greater resistance to erosion. Thus combined teaching of Jones and Doan results in a field emitter device having the configuration of external coating on the emitter surface and ion deposited oxide layer conforming to the entire surface of the emitter formed underneath the surface of the emitter.

Regarding claim 2 the limitation reciting for inhibiting outgassing is functional and is inherent to the emitter of Jones as evidenced by Jones' disclosure of all the claimed structural limitations.

Referring to claims 3,5,7,9,11 Jones in view of Doan disclose the structure of the emitter having external coating and ion beam deposited or implanted oxide layer conforming to the entire surface of the emitter for emission of electrons. The limitations reciting 'for lowering potential barrier', 'for affecting a lowering mechanism', 'for affecting an image force', 'for enhancing the Schottky effect', and 'for decreasing a dielectric effect' to enhance the emission of electrons are functional and it is the position of the examiner that the emitter of Jones and Doan would certainly have the capability of doing the subject functions as evidenced by the disclosure of same claimed structural limitations.

Claims 13 and 15 essentially recite the same limitations as of claims 2 and 3 and hence are rejected for the same reason.

Regarding claims 14 Jones discloses (column 17 lines 49-51 Fig. 25) the overlayer 409 is applied by ion beam deposition and hence is embedded in the surface of the emitter 402.

Claims 17,19 and 21 essentially recite the same limitation as of claims 7,9 and 11 respectively and hence are rejected for the same reasons.

Claims 18 and 22 recite the same limitations as of claim 14 and hence are rejected for the same reason.

Regarding claims 23,24 Jones in view of Doan discloses an external coating and silicon oxide implantation layer conforming to the entire surface of the emitter for releasing electrons at a predetermined energy level, the oxide implantation layer being formed underneath the surface of the emitter.

Claims 25 and 26 essentially recite the same limitation as of claim 23 and hence are rejected for the same reason (the embedded layer being same as implanted layer).

Regarding claims 4,6,8,10,12, Jones in view of Doan disclose the structure of the emitter having external coating and ion beam deposited or implanted oxide layer conforming to the entire surface of the emitter for emission of electrons. The combined teaching of Jones and Doan results in a field emitter device having the configuration of external coating on the emitter surface and ion deposited oxide layer conforming to the entire surface of the emitter formed underneath the surface of the emitter.

The limitations reciting 'for lowering potential barrier', 'for affecting a lowering mechanism', 'for affecting an image force', 'for enhancing the Schottky effect', and 'for

decreasing a dielectric effect' to enhance the emission of electrons are functional and it is the position of the examiner that the emitter of Jones and Doan would certainly have the capability of doing the subject functions as evidenced by the disclosure of same claimed structural limitations.

Claims 16 and 20 essentially recite the same limitations as of claim 2 and hence are rejected for the same reason.

Claims 27-32 essentially recite the same limitations as of claims 2,3,5,7,9 and 11 respectively for an emitter with external coating and an embedded oxide layer conforming to the surface of the emitter. Jones discloses (column 17 lines 38-42, 49-51 Fig. 25) the overlayer 409 is applied by ion beam deposition or doping with metal oxide dopant species to enhance electron emission and hence the oxide layer is embedded in the surface of the emitter 402. Therefore these claims are rejected for the same reasons as for claims 2,3,5,7,9 and 11.

Regarding claims 33, 34 and 35 Jones in view of Doan disclose the structure of the emitter having external coating and ion beam deposited or implanted oxide layer conforming to the entire surface of the emitter for emission of electrons. The limitations reciting 'for lowering potential barrier to enhance the emission of electrons' and 'for inhibiting degradation of the emitter' are functional and it is the position of the examiner that the emitter of Jones and Doan would certainly have the capability of doing the subject functions as evidenced by the disclosure of same claimed structural limitations. Furthermore Jones discloses (column 10 lines 52-63 Fig. 9) the field emitter device

having a light-emitting target (anode plate member) 84 coated with array of cathode-luminescent elements and phosphorescent phosphors.

Regarding claim 36 Jones in view of Doan disclose the structure of the emitter having external coating and ion beam deposited or implanted oxide layer conforming to the entire surface of the emitter for emission of electrons. The limitations reciting 'for reducing a dielectric effect of the emitter, being stable in presence of outgassing' is functional and it is the position of the examiner that the emitter of Jones and Doan would certainly have the capability of doing the subject functions as evidenced by the disclosure of same claimed structural limitations. Jones discloses (column 10 lines 52-63 Fig. 9) the field emitter device having a light-emitting target (anode plate member) 84 coated with array of cathode-luminescent elements and phosphorescent phosphors. Furthermore Jones discloses (column 18 lines 30-33) the array of field emitters with this configuration can be used in cathodoluminescent video displays with display screens.

Response to Arguments

Applicant's arguments with respect to claims 1-3,5,7,9,11,13-15,17-19,21-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Art Unit: 2879

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S.R.

Sikha Roy
Patent Examiner
Art Unit 2879

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